

CLAIMS:

1. A fuel injection valve comprising, an injection hole, a valve seat located at the upstream side of the injection hole, a valve body which performs opening and closing of a fuel passage with the valve seat, and a driving means for driving the valve body, wherein either a groove or a projecting portion is provided around the injection hole along the circumferential direction thereof.

2. A fuel injection valve comprising, a plate member having a plurality of injection holes penetrating into the thickness direction thereof, a valve seat located at the upstream side of the injection hole, a valve body which performs opening and closing of a fuel passage with the valve seat, and a driving means for driving the valve body, wherein a flat portion is provided between the respective injection hole on the face of the plate member in the fuel passage is provided as well as a groove formed along the circumferential direction of the respective injection holes is provided.

3. A fuel injection valve according to claim 2, wherein the injection hole is provided in plural number on the plate member while being separated by the flat portion, and the distance between the groove formed around the injection hole and the injection hole is determined smaller than the length of the flat portion formed between the injection holes.

4. A fuel injection valve according to claim 2, wherein the injection hole is provided in plural number on the plate member while being separated by the flat portion, and the grooves

provided between the respective injection holes on the face of the plate member are worked to form in circular shape.

5 5. A fuel injection valve according to claim 2, wherein the injection hole is provided in plural number on the plate member while being separated by the flat portion, and the grooves provided between the respective injection holes on the face of the plate member are worked in such a manner that the vertical cross section of the grooves forms a V shape.

10 6. A fuel injection valve according to claim 5, wherein an inclination angle of the inner wall near each injection hole of the V shaped grooves provided between the respective injection holes on the face of the plate member is worked be large in comparison with an inclination angle of the inner wall thereof remote from the injection hole.

15 7. An internal combustion engine comprising, a cylinder, a piston which reciprocates in the cylinder, an intake means which introduces air into the cylinder, an exhaust means which exhausts combustion gas from the cylinder, a fuel injection valve which directly injects fuel in to the cylinder, a fuel supply means
20 which supplies the fuel from a fuel tank to the fuel injection valve, and an ignition device which ignites mixture gas of the air introduced by the intake means in to the cylinder and the fuel injected by the fuel injection valve in to the cylinder, wherein the fuel injection valve including, a plate member having
25 a plurality of injection holes penetrating into the thickness direction thereof, a valve seat located at the upstream side of the injection hole, a valve body which performs opening and

closing of a fuel passage with the valve seat, and a driving means for driving the valve body, wherein a flat portion is provided between the respective injection hole on the face of the plate member in the fuel passage is provided as well as a
5 groove formed along the circumferential direction of the respective injection holes is provided.

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